

Publications and Training Solutions

Course Syllabus: 523-0808076

COURSE TITLE: Learjet 60XR Pro Line 21
Level I Operations & Flight Line Maintenance

PREREQUISITES: Students should have basic knowledge of aircraft avionics systems and a working command of the English language (interpreters are available for special cases).

PURPOSE: This course provides line maintenance personnel with training to operate and perform flightline maintenance for the Pro Line 21 System.

This course is designed to teach troubleshooting for replacement of line replacement units (LRUs) and does not include internal maintenance of any component.

The Pro Line 21 System consists of the LRUs identified in the section titled EQUIPMENT TYPE by nomenclature and part number, including associated peripheral equipment identified as deliverable hardware.

OBJECTIVES: Upon completing this course, the student will be able to:

1. Provide an overall understanding of Pro Line 21 Avionics Principles and Operation.
2. Identify System Components and the Functional/Operational Characteristics of each LRU.
3. Identify Typical Aircraft System Interface/System Architecture.
4. Perform Fault Isolation to a faulty LRU using Built-In Maintenance Diagnostics.

COURSE LENGTH: 5 Days

TRAINING DEVICES:

1. Special Test Equipment
 - a. Test Rig, Cedar Rapids (if available)

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TRAINING MATERIALS:

1. PowerPoint Presentation with LCD/Box Light projector
2. Student Guide – Flash drive (pdf) – Training Presentation
Information Sheets

REFERENCES:

1. Bombardier Aerospace Learjet 60XR Avionics System Diagnostic Guide 523-0807944

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COURSE OUTLINE

0. Welcome & Introductions

- A. Course Overview
 - i. Welcome
 - ii. Student Registration
- B. Course Description and Objectives

1. Data Bus

- A. Why We Use Data Buses
- B. ARINC Data Buses
 - i. ARINC 429
 - ii. ARINC 453

2. Integrated Avionics Processing System (IAPS)

- A. Overview
- B. System Architecture
- C. Integrated Card Cage (ICC)
- D. Power Supply Module (PWR)
- E. IAPS Environmental Controller (IEC)
- F. Input/Output Concentrator (IOC)
- G. Maintenance Diagnostic Computer (MDC)
- H. Configuration Strapping Unit (CSU)
- I. Detailed Functional Theory
 - i. IAPS Power Distribution
 - ii. Temperature Monitoring
 - iii. Overheat Reporting
 - iv. Power Supply Inhibit
 - v. CSU Detailed Theory

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- J. Maintenance and Troubleshooting
 - i. PWR Fault Indications
 - ii. IEC Fault Indications
 - iii. Status Messages
 - iv. Diagnostics
- 3. Maintenance Diagnostics**
 - A. Overview
 - B. Maintenance Diagnostic Computer (MDC)
- 4. Electronic Flight Instrument System (EFIS)**
 - A. Overview
 - B. Adaptive Flight Display
 - i. Primary Flight Display (PFD)
 - ii. Multifunction Display (MFD)
 - C. Reversion Switch Panel (RSP)
- 5. Integrated Flight Information System (IFIS)**
 - A. Overview
 - B. File Server Unit (FSU)
 - i. File Server Applications
 - ii. Enhanced Map Functions
 - iii. Electronic Charts
 - iv. Graphical Weather
 - C. External Compensation Unit (ECU)
 - D. Encrypted Application Key (EAK)
 - E. Electronic Charts Region Access Keys
 - F. Maintenance and Troubleshooting
 - i. Database Effective Dates

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6. Engine Indicating System (EIS)

- A. Overview
- B. MFD Indications
 - i. Normal
 - ii. Transient
 - iii. Redline
 - iv. Compressed
 - v. Comparators
- C. Data Concentrator Unit (DCU)
- D. Engine Data Concentrator Unit (EDC)
- E. Maintenance and Troubleshooting
 - i. Status Messages
 - ii. Diagnostics

7. Air Data System (ADS)

- A. Overview
- B. Air Data Computer (ADC)
- C. Air Data Configuration Table (ADT)
- D. Maintenance and Troubleshooting
 - i. PFD Red Flags
 - ii. PFD Source Reversion
 - iii. Diagnostics

8. Attitude Heading System (AHS)

- A. Overview
- B. Attitude Heading Computer (AHC)
- C. External Compensation Unit (ECU)
- D. Flux Detector Unit (FDU)

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- E. Maintenance and Troubleshooting
 - i. Diagnostics
 - ii. Post Installation Check
 - iii. Compass Compensation Procedure
 - iv. Automatic Leveling Procedure

9. Flight Guidance System (FGS)

- A. Overview
- B. Flight Guidance Computers (FGC)
- C. Flight Guidance Panel (FGP)
- D. Primary Servos (SVO)
- E. Autopilot and Yaw Damper Detailed Theory of Operation
 - i. Description of Fail Passive System
 - ii. Description of Null Seeking Servo Loops
- F. Autopilot Diagnostics
 - i. Entering and Using Autopilot Diagnostics
 - 1. Input Mode
 - 2. Output Mode
 - 3. Report Mode

10. Flight Management System (FMS)

- A. Overview
- B. Flight Management Computer (FMC)
- C. Control Display Unit (CDU)
- D. Database Unit (DBU)
- E. Flight Management Data Base Operations
 - i. 28 Day Database Load Procedure

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11. Database Loading Operations

- A. Overview
- B. Data Base Unit (DBU)
 - i. Uploading Databases
 - ii. Downloading Data
- C. Personal Computer Dataloader (PCD)
 - i. Uploading Databases
 - ii. Downloading Data
- D. Collins Portable Access Software (CPAS)
 - i. Importing Databases
 - ii. Uploading Databases
 - iii. Downloading Data

12. Radio Sensor System (RSS)

- A. Overview
- B. Radio Tuning Operations
- C. VHF Comm Receiver/Transmitter (VHF)
 - i. Datalink/CPDLC/Link 2000+
- D. VOR/ILS/MB/ADF Receiver (NAV)
- E. Distance Measuring Equipment (DME)
- F. Radio Altimeter (ALT)
- G. Mode S Transponder (TDR-94D) with TCAS
 - i. Video – TCAS II Operations CHANGE 7.0
- H. Maintenance and Troubleshooting
 - i. Flight Line Diagnostic Procedures
 - ii. Antenna Maintenance Considerations

523-0779512

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13. Turbulence Weather Radar (TWR)

- A. Overview
- B. Microwave Radiation Hazards
 - i. AC 20-68B
- C. Weather Radar Theory
 - i. Video – The Next Generation Weather Radar 523-0778191
- D. Receiver/Transmitter Assembly (XMWR-1000)
- E. Maintenance and Troubleshooting
 - i. Radome Maintenance (AC 43-13)
 - ii. Flight Line Diagnostic Procedures

14. Summary – Review - Critique

- A. Test
- B. Critiques

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EQUIPMENT TYPE:

EQUIPMENT	NOMENCLATURE	PART NUMBER
Integrated Card Cage	ICC-3000	822-1129-001
IAPS Environmental Control	IEC-3001	822-1167-001
Input Output Concentrator	IOC-3100	822-1361-103
Power Supply Module	PWR-3000	822-1137-001
Central Strapping Unit	CSU-3100	822-1363-002
Options Control Module	OCM-3100	822-1484-201*
Maintenance Diagnostic Computer	MDC-3110	822-1987-XXX
Maintenance Diagnostic Tables	MDT-3110	810-0042-XXX
Adaptive Flight Display (PFD, MFD)	AFD-3010E	822-1753-XXX
Adaptive Flight Display (PFD, MFD)	AFD-3010	822-1084-XXX
Cursor Control Panel	CCP-3000	822-1746-102
External Compensation Unit	ECU-3000	822-1200-998
File Server Unit	FSU-5010	822-1543-100
File Server Application Software	FSA-5000	810-0001-001
Collins Portable Access Software	CPAS-3000	810-0032-001
Display Control Panel	DCP-3040	822-2117-002
Data Concentration Unit	DCU-3001	822-1483-XXX
Air Data Computer	ADC-850D	822-0389-XXX
Signal Interface Adapter	SIA-850	622-9732-003
Attitude/Heading Computer	AHC-3000	822-1110-002
External Compensation Unit	ECU-3000	822-1200-002
Flux Detector Unit	FDU-70	622-5812-001
Flight Guidance Computer	FGC-3000	822-1108-XXX
Primary Servo	SVO-85B	622-5027-102
Servo Mount	SMT-85B	622-5029-101
Flight Guidance Computer	FGC-3000	822-1108-XXX
Primary Servo	SVO-85B	622-5027-102

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EQUIPMENT	NOMENCLATURE	PART NUMBER
Servo Mount	SMT-85B	622-5029-101
Flight Management Computer	FMC-5000	822-0891-XXX
Control Display Unit	CDU-3000	822-0884-XXX
Data Base Unit	DBU-4100	822-0014-104
ADF Receiver	ADF-462	622-7382-101
ADF Antenna	ANT-462B	622-7384-001
Radio Altimeter	ALT-4000	822-0615-001
Distance Measuring Equipment	DME-442	622-7309-101
Global Positioning System	GPS-4000A	822-1377-001
VHF Navigation Receiver	VIR-432	622-7194-201
Radio Tuning Unit (TCAS)	RTU-4220	822-0730-XXX
Transponder	TDR-94D	622-9210-007
TCAS TX/RX	TTR-4000	822-1294-002
TCAS Directional Antenna	TRE-920	622-8973-001
VHF Transceiver	VHF-422A	622-7292-101
Receiver Transmitter Antenna	RTA-844	622-9302-004
File Server Unit	FSU-5010	822-1543-101
File Server Application Software	FSA-5000	810-0001-100
External Compensation Unit	ECU-3000	822-1200-998
FSU Mount	MMT-5000	822-1811-003
PC Database Unit	PCD-3000	822-1631-003
Electronic Charts	ECH-5000	810-0002-001
Map Overlays	OVL-5000	810-0003-001

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EQUIPMENT	NOMENCLATURE	PART NUMBER
Collins Portable Access Software	CPAS-3000	810-0032-001
VHF Transceiver	VHF-4000	822-1468-302
Communication Management Unit	CMU-4000	822-1739-002
CMU Mount	MMT-130	622-9671-001
External Compensation Unit	ECU-3000	822-1200-999
MMT-125/MMT-130 Piggyback Mount Kit	VHF-4000/ CMU-4000 Mnt Kit	653-9078-106
VHF Transceiver	VHF-4000	822-1468-302
Graphical Weather	GWX-3000	810-0007-001
XM Receiver	XMWR-1000	822-2031-001
XM Antenna	XMA-1000	822-2030-001
NAV/COM Control	CTL-23	822-1121-002